

Diasphere[®]

is Organic Polymer
Bead of ASP

Diffusion Agents of diffusion film and plate

Matting/Texture Agent of paint, Ink and plastic

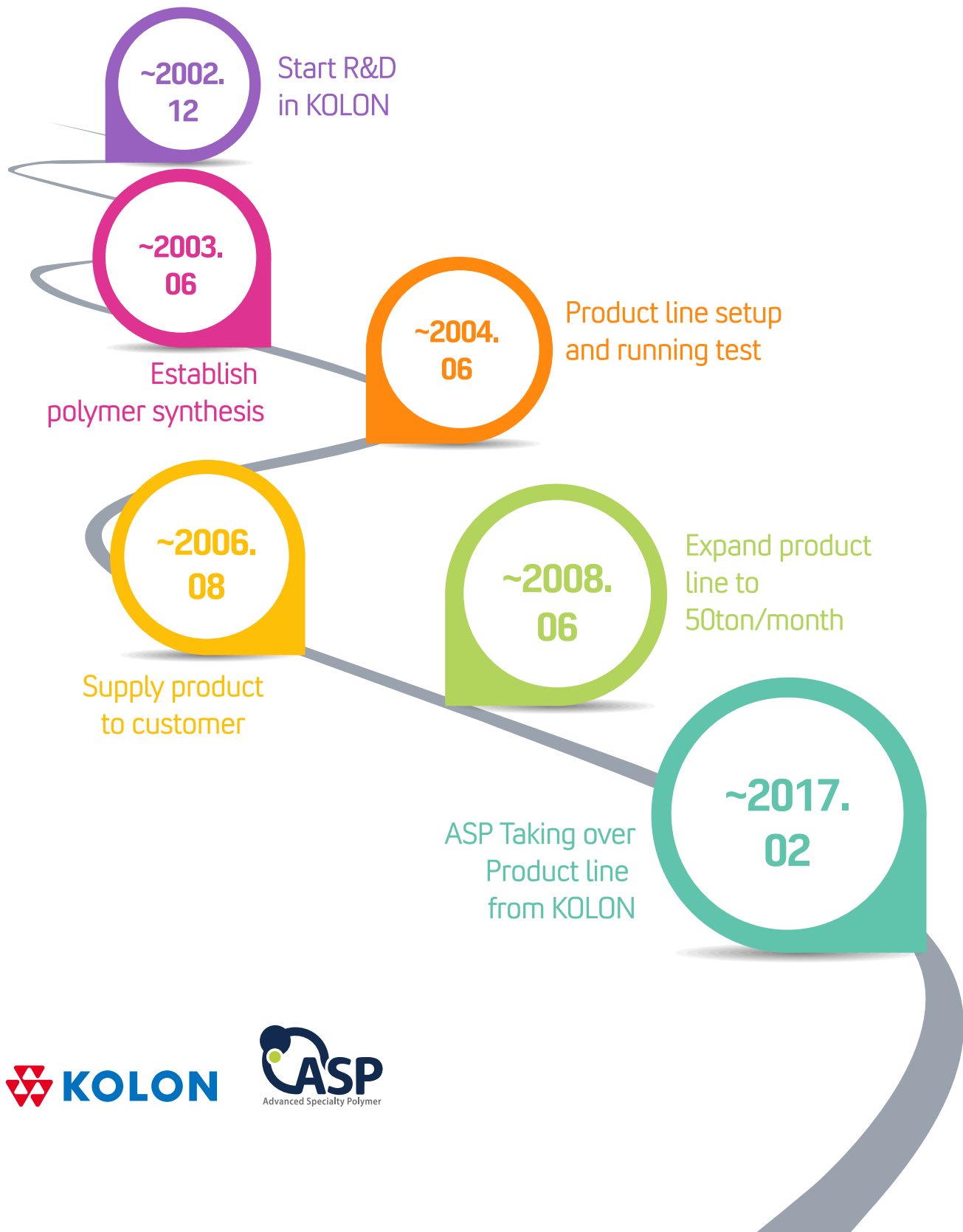
Anti-blocking Agents of Packaging PP film and Leather surface

Anti-Glare Agents of functional film

Pore forming agents of ceramic material

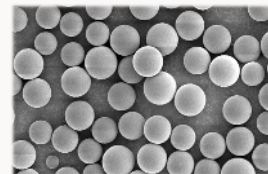
Filler of Cosmetics and Toiletries

Advanced Specialty
Polymer Ltd. for
Diasphere®



Diasphere[®] is the brand name of ASP Co., Ltd

- Spherical polymeric beads having 0.2 ~ 100 μ m average particle size by very unique polymerization technique.
- Functional organic polymeric bead based on acrylic monomer and its co-monomer, styrene monomer and silane derivatives.
- Application : Light diffusing agent for light diffusing film and plate, texture and anti-slip agent for paint and coatings, filler for cosmetics and toiletries, delustering/texture and anti-blocking agent for plastics and film, pore forming agent for ceramic material and so on.



Display



Lighting Plate



Home appliance



Packaging film



Car DPF/GPF



Cosmetics



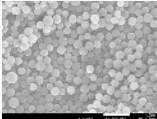
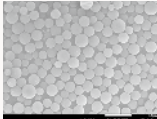
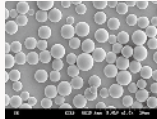
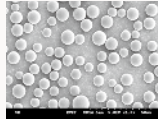
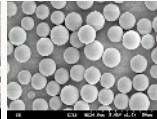
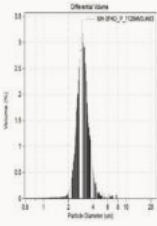
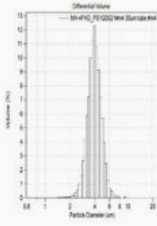
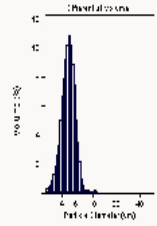
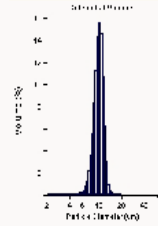
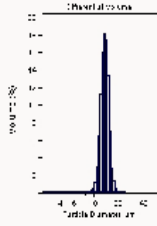
Diasphere[®] Line-up

Material	Grade	Ave. Particle Size(um)	Refractive Index	Thermal Property ¹⁾	Hardness ²⁾
Acrylic Polymer (PBMA)	BH-5	5	1.48	240℃~260℃	10
	BH-10	10			
Acrylic Polymer (PMMA)	MH-3FHD	3	1.49	315℃	27
	MH-4FHD	4		320℃	
	MH-5FHD	5		322℃	
	MH-5FD	5		240℃~260℃	
	MH-10FD	10			
	MH-15FD	14			
	MH-20FD	20			
	MH-25FD	24			
	MH-30FD	30			
	MH-40FD	40			
	MH-50FD	50			
	MH-60FD	60			
	MH-70FD	70			
	MH-80FD	80			
	MH-100FD	100			
Styrene Polymer (PS)	MS-3FHC	3	1.59	310℃	25
	MS-5FHC	5			
	MS-10FHC	10			
Core/shell type Styrene Polymer in water base (PS)	SNX-200H	0.2	1.49	295℃	25
	SNX-400H	0.4			
	SNX-600H	0.6			
Silicone (PMSQ)	KS-200	2	1.42	Over 400℃	15
	KS-500	5			
	KS-1000	10			

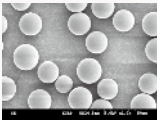
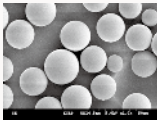
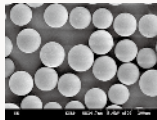
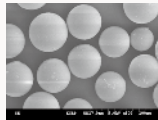
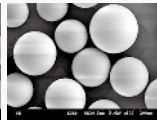
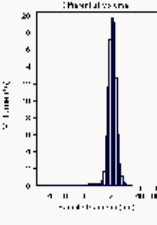
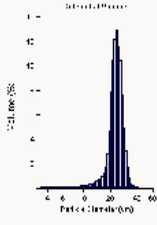
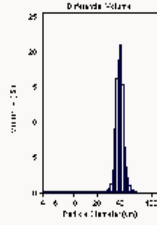
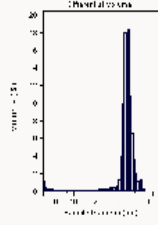
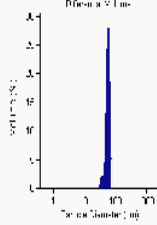
1) 3% Weight Loss by TGA

2) 10% Compression Strength, Mpa by MCTM

Diasphere®
Line-up

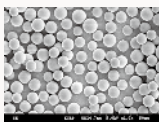
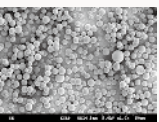
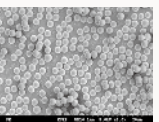
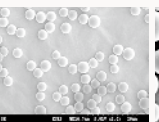
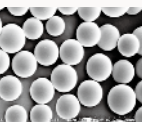
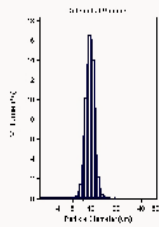
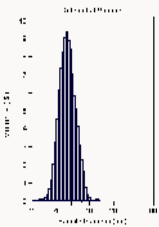
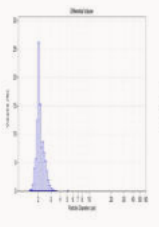
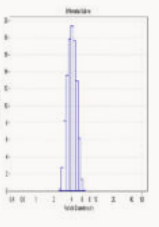
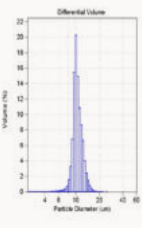
	PMMA				
	MH-3FHD	MH-4FHD	MH-5FHD/5FD	MH-10FD	MH-15FD
SIZE(μm)	3	4	5	10	13
SEM Image					
PSD					

•SEM Image : MH-3FHD, 4FHD, 5FHD x 2.0k and 10FD, 15FD x 1.0k
•PSD(Particle Size Distribution) : Coulter Multisizer 4

	PMMA				
	MH-20FD	MH-25FD	MH-40FD	MH-60FD	MH-80FD
SIZE(μm)	20	25	40	60	80
SEM Image					
PSD					

•SEM Image : MH-20FD, 25FDx1.0k and MH-40FD, 60FD, 80FDx500
•PSD(Particle Size Distribution) : Coulter Multisizer 4, LS 13 320

Diasphere® Line-up

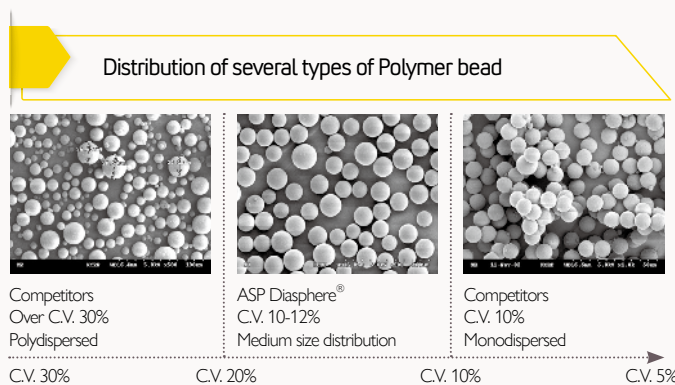
	Styrene	PBMA	Silicone		
	MS-10FHC	BH-5	KS-200C	KS-500	KS-1000
SIZE(μm)	10	5	2	5	9
SEM Image					
PSD					

•SEM Image : MS-10FDC, BH-5 x 1.0k and Silicone x 2.0k

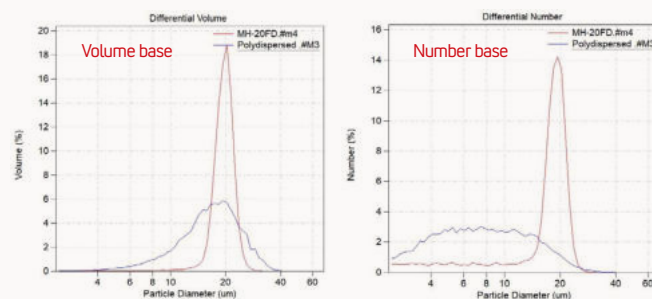
•PSD(Particle Size Distribution) : Coulter Multisizer 4

Key Characteristic of Diasphere®

1) Narrow size distribution

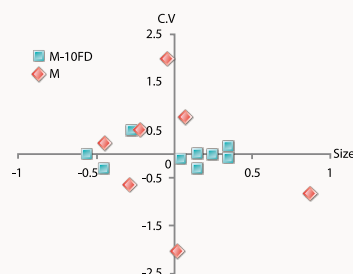


Same method as
polydispersed bead,
but provide close to
monodispersed product



Provide very narrower
size distribution than
polydispersed one and
see the big difference in
volume mode and even
more in number mode.

Key Characteristic of Diasphere®



• Each of square and diamond values mean the variance from mean value.

2) Quality Reliability

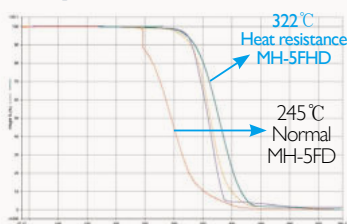
- Lower Deviation of Avg. and C.V., Higher Quality Reliability
- Support customer to give higher quality solution

C.V. and Mean size data of MH-10FD and competitor

C.V.(%)	1	2	3	4	5	6	7	8	9	AVG.	Standard Deviation
MH-10FD	15.0	14.8	14.8	15.1	15.0	15.1	15.2	15.6	15.1	15.08	0.24
"M"	38.9	39.2	37.8	38.6	37.6	36.4	40.4			38.41	1.29
Size(μm)	1	2	3	4	5	6	7	8	9		
MH-10FD	10.0	9.8	9.2	9.1	9.7	9.9	10.0	9.4	9.4	9.66	0.34
"M"	11.9	12.2	11.8	11.6	12.9	12.1	12.1			12.09	0.42

• "M" : Competitor "S" 10μm polydispersed PMMA

Decomposition Temperature(97%)



• TGA Test

3) Higher Heat Resistance Organic Polymer Bead

- Higher decomposition temperature than normal organic bead.
- Not yellowed in process because of less weight loss.
- Recommended where resins are kneaded with high temperature.
- At 280°C oven test, Heat resistance bead show concrete thermal properties.

300°C Oven Test	10min	30min	Color Change	Drying Loss
Heat Resistance			No	1.5%
Normal			Yellow	62.2%

- 10% Bead in M/B with PC matrix and 5% M/B is loaded in PC sheet.

	L*	a*	b*	YI
Heat 5FD MB	76.96	-0.85	0.97	
Normal 5FD MB	75.31	-0.83	1.33	
Heat 5FD PC Sheet	78.81	-0.187	1.407	2.43
Normal 5FD PC Sheet	77.88	-0.302	1.913	3.37

Characteristic of Diasphere® for New Application

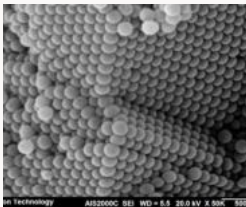
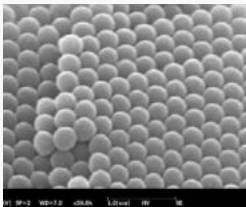
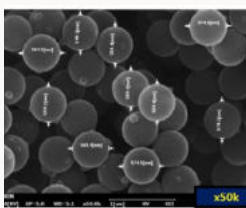
New Products

Poly(St-co-Acrylate)



Functional
Silane end-group

Highly crosslinked Polystyrene core/shell structured nano size particle

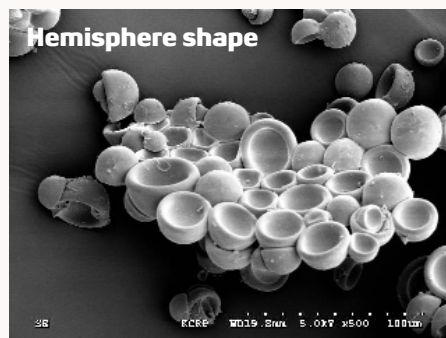
Name	SNX-200H	SNX-400H	SNX-600H
Particle size(nm)	200	400	600
SEM Image (15K)			

• Particle size is measured by Malvern Zetasizer

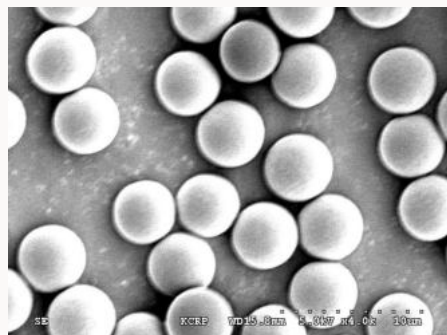
Key Characteristic of Diasphere®

New Products

Shape controlled bead



Monodispersed PMMA



Special surface treatment bead with several types of material like metal and inorganic by customer's requirements

